CEMENT and CONCRETE RESEARCH. Vol. 23, pp. 1493-1503, 1993. Printed in the USA.
0008-8846/93. $6.00+00. Copyright © 1993 Pergamon Press Ltd.

INDEX TO VOLUME 23

1993 Volume 23, Number 1 January

T. Kosmac, G. Lahajnar and A. Sepe: Proton NMR Relaxation Study of Calcium Aluminate Hydration Reactions 1
M.A. Issa and A.M. Hammad: Fractal Characterization of Fracture Surfaces in Mortar 7
U. Schneider and E. Nägele: Stress Corrosion of Cement Mortars in Ammoniumsulfate Solution 13
F. Puertas, M.T. Blanco Varela and R. Domínguez: Hydration of $4CaO.Al_2O_3.Mn_2O_3$ in the Absence and the Presence of Gypsum. A Comparative Study with the Hydration of $4CaO.Al_2O_3.Fe_2O_3$ 20
J.A. González, E. Otero, S. Feliu and W. López: Initial Steps of Corrosion in the Steel/$Ca(OH)_2 + Cl^-$ System: The Role of Heterogeneities on the Steel Surface and Oxygen Supply 33
R.C. Sharma, N.K. Jain and S.N. Ghosh: Semi-Theoretical Method for the Assessment of Reactivity of Fly Ashes 41
M.I. Sánchez de Rojas, M. P. Luxán, M. Frías and N. García: The Influence of Different Additions on Portland Cement Hydration Heat 46
T. Taguchi, S. Chatterji and M. Kawamura: A Comparison of Different Methods of Detection of Alkali-Silica Reactivity of Aggregates 55
R.L. Goguel and D.A. St. John: Chemical Identification of Portland Cements in New Zealand Concretes: I. Characteristic Differences Among New Zealand Cements in Minor and Trace Element Chemistry 59
S. Huovinen: Abrasion of Concrete Structures by Ice 69
S. Mindess and C. Yan: Perforation of Plain and Fibre Reinforced Concretes Subjected to Low-Velocity Impact Loading 83
Roger Dron and Françoise Brivot: Thermodynamic and Kinetic Approach to the Alkali-Silica Reaction. Part 2: Experiment 93
C. Lobo and M.D. Cohen: Hydration of Type K Expansive Cement Paste and the Effect of Silica Fume: II. Pore Solution Analysis and Proposed Hydration Mechanism 104
E. Erdem and H. Ölmez: The Mechanical Properties of Supersulphated Cement Containing Phosphogypsum 115
M. Moukwa, D. Youn and M. Hassanali: Effects of Degree of Polymerization of Water Soluble Polymers on Concrete Properties 122
I.G. Richardson and G.W. Groves: The Incorporation of Minor and Trace Elements into Calcium Silicate Hydrate (C-S-H) Gel in Hardened Cement Pastes 131
O.S.B. Al-Amoudi and M. Maslehuddin: The Effect of Chloride and Sulfate Ions on Reinforcement Corrosion 139
A.U. Nilsen and P.J.M. Monteiro: Concrete: A Three Phase Material 147
V.T. Yilmaz, M. Odabasoglu, H. Içbudak and H. Ölmez: The Degradation of Cement Superplasticizers in a High Alkaline Solution 152
P. Gu, P. Xie, J.J. Beaudoin and R. Brousseau: A.C. Impedance Spectroscopy. II. Microstructural Characterization of Hydrating Cement-Silica Fume Systems 157
R. Rassem, H. Zanni-Théveneau, D. Heidemann and A.R. Grimmer: Proton High Resolution Solid State NMR Study of C_3S Hydration 169
T. Matusinovic and N. Vrbos: Alkali Metal Salts as Set Accelerators for High Alumina Cement 177
Z. Xu, M. Tang and J.J. Beaudoin: Relationships Between Composition, Structure and Mechanical Properties of Very Low Porosity Cementitious Systems 187
C.D. Hills, C.J. Sollars and R. Perry: Ordinary Portland Cement Based Solidification of Toxic Wastes: The Role of OPC Reviewed 196
M. Singh and M. Garg: Microstructure of Glass Fibre Reinforced Water Resistant Gypsum Binder Composites 213
D. Damidot and F.P. Glasser: Thermodynamic Investigation of the $CaO-Al_2O_3-CaSO_4-H_2O$ System at 25°C and the Influence of Na_2O 221

R.C. Sharma and N.K. Jain: An Indian Fly Ash with High Percentage of Cenospheres 239

DISCUSSIONS
C.A. White 241
C.M. Sangha, B.A. Plunkett, P.J. Walden and M.J. Al-Hussaini 242

NEWS ITEMS 243
LETTER TO THE EDITOR 245

1993 **Volume 23, Number 2** **March**

L. Tang and L.-O. Nilsson: Chloride Binding Capacity and Binding Isotherms of OPC Pastes and Mortars 247
S.S. Seehra, S. Gupta and S. Kumar: Rapid Setting Magnesium Phosphate Cement for Quick Repair of Concrete Pavements - Characterisation and Durability Aspects 254
M.N. Muhamad, P. Barnes, C.H. Fentiman, D. Hausermann, H. Pollmann and S. Rashid: A Time-Resolved Synchrotron Energy Dispersive Diffraction Study of the Dynamic Aspects of the Synthesis of Ettringite During Minepacking 267
M.A. Schultz and L.J. Struble: Use of Oscillatory Shear to Study Flow Behavior of Fresh Cement Paste 273
R.L. Goguel and D.A. St. John: Chemical Identification of Portland Cements in New Zealand Concretes. II. The Ca-Sr-Mn Plot in Cement Identification and the Effect of Aggregates 283
J. Havlica, D. Roztocká and S. Sahu: Hydration Kinetics of Calciumaluminate Phases in the Presence of Various Ratios of Ca^{2+} and SO_4^{2-} Ions in Liquid Phase 294
C. Atzeni, L. Massidda and U. Sanna: Dimensional Variations, Capillary Absorption and Freeze-Thaw Resistance of Repair Mortars Admixed with Polymers 301
M. Brouxel: The Alkali-Aggregate Reaction Rim: Na_2O, SiO_2, K_2O and CaO Chemical Distribution ... 309
R. Gabrovsek, B. Kurbus, D. Mueller and W. Wieker: Tobermorite Formation in the System CaO, C_3S-SiO_2-Al_2O_3-NaOH-H_2O under Hydrothermal Conditions 321
L. Curtil, J. Gielly and M. Murat: The Polarizing Microscope: A Tool of Interest for Investigation on Concrete; Application to Carbonation 329
D. Breton, A. Carles-Gibergues, G. Ballivy and J. Grandet: Contribution to the Formation Mechanism of the Transition Zone Between Rock-Cement Paste 335
J. Desbrieres: Cement Cake Properties in Static Filtration. Influence of Polymeric Additives on Cement Filter Cake Permeability 347
P. Xie, P. Gu, Z. Xu and J.J. Beaudoin: A Rationalized A.C. Impedance Model for Microstructural Characterization of Hydrating Cement Systems 359
W. López and J.A. González: Influence of the Degree of Pore Saturation on the Resistivity of Concrete and the Corrosion Rate of Steel Reinforcement 368
Z. Xu, M. Tang and J.J. Beaudoin: An Ideal Structural Model for Very Low Porosity Cementitious Systems 377
A.A. Ikpong: The Relationship Between the Strength and Non-Destructive Parameters of Rice Husk Ash Concrete 387
J.E. Ash, M.G. Hall, J.I. Langford and M. Mellas: Estimations of Degree of Hydration of Portland Cement Pastes 399
T. Häkkinen: The Influence of Slag Content on the Microstructure, Permeability and Mechanical Properties of Concrete. Part 1. Microstructural Studies and Basic Mechanical Properties 407
H. Poellmann, St. Auer, H.-J. Kuzel and R. Wenda: Solid Solution of Ettringites: Part II: Incorporation of $B(OH)_4^-$ and CrO_4^{2-} in $3CaO.Al_2O_3.3CaSO_4.32H_2O$ 422
A. Carles-Gibergues, F. Saucier, J. Grandet and M. Pigeon: New-to-Old Concrete Bonding: Influence of Sulfates Type of New Concrete on Interface Microstructure 431
L. De Ceukelaire and D. Van Nieuwenburg: Accelerated Carbonation of a Blast-Furnace Cement Concrete 442
H. Siedel, S. Hempel and R. Hempel: Secondary Ettringite Formation in Heat Treated Portland Cement Concrete: Influence of Different W/C Ratios and Heat Treatment Temperatures 453
Z. Xu, Y. Deng, X. Wu, M. Tang and J.J. Beaudoin: Influence of Various Hydraulic Binders on Performance of Very Low Porosity Cementitious Systems 462

S.J. Way and A. Shayan: Synthesis and Characterisation of Crystalline Analogues of Alkali-Aggregate Reaction Products 471
G.-K. Sun and J.F. Young: Quantitative Determination of Residual Silica Fume in DSP Cement Pastes by ^{29}Si NMR 480
M.U.K. Afridi, Y. Ohama, K. Demura and M.Z. Iqbal: A Note on the Formation of $Ca(OH)_2$ Crystals in Polymer-Modified Mortars 484

DISCUSSIONS
J. Bensted 486
J.J. Beaudoin and V.S. Ramachandran 488
J. Bensted 489
Y. Erdogan, H. Genç and A. Demirbas 491
J. Bensted 493
D.W. Hobbs 495
R.G. Sibbick and C.L. Page 498

NEWS ITEMS 500

1993 **Volume 23, Number 3** **May**

D.E. Macphee, C.J. Black and A.H. Taylor: Cements Incorporating Brown Coal Fly Ash from the Latrobe Valley Region of Victoria, Australia 507
T. Häkkinen: The Influence of Slag Content on the Microstructure, Permeability and Mechanical Properties of Concrete. Part 2. Technical Properties and Theoretical Examinations 518
P. Gu, Z. Xu, P. Xie and J.J. Beaudoin: Application of A.C. Impedance Techniques in Studies of Porous Cementitious Materials. (I) Influence of Solid Phase and Pore Solution on High Frequency Resistance 531
D. Bonen: A Microstructural Study of the Effect Produced by Magnesium Sulfate on Plain and Silica Fume-Bearing Portland Cement Mortars 541
R.K. Dhir and E.A. Byars: PFA Concrete: Permeation Properties of Cover to Steel Reinforcement 554
M.G. Alexander: Two Experimental Techniques for Studying the Effects of the Interfacial Zone between Cement Paste and Rock 567
J.E. Ash and M. Mellas: Application of Backscattered Electron Imaging to Concrete Materials 576
P. Gu, P. Xie and J.J. Beaudoin: Microstructural Characterization of the Transition Zone in Cement Systems by Means of A.C. Impedance Spectroscopy 581
A.M. Alshamsi, A.R. Sabouni and A.H. Bushlaibi: Influence of Set-Retarding Superplasticisers and Microsilica on Setting Times of Pastes at Various Temperatures 592
K. Fukuda and I. Maki: Orientation of Coherent Interphase Boundaries Formed by the α to α'_H Phase Transition in Belite Crystals 599
V.T. Yilmaz, N. Menek and M. Odabasoglu: Quantitative Determination of Triethanolamine in Cements 603
M.L. Allan: Toughness of Reinforcement/Concrete Bond in Tensile Loading 609
H.A. Toutanji, T. El-Korchi, R.N. Katz and G.L. Leatherman: Behaviour of Carbon Fiber Reinforced Cement Composites in Direct Tension 618
P.S. de Silva and F.P. Glasser: Phase Relations in the System $CaO-Al_2O_3-SiO_2-H_2O$ Relevant to Metakaolin - Calcium Hydroxide Hydration 627
H. Wu and E.W. Brooman: Study of Use of Ultrasound Technology to Prepare Polymer-Impregnated Concrete 640
G. Kakali and S. Tsivilis: The Effect of Intergrinding and Separate Grinding of Cement Raw Mix on the Burning Process 651
A. Benaissa, P. Morlier and C. Viguier: Microstructure du Beton de Sable 663
P. Gu, Z. Xu, P. Xie and J.J. Beaudoin: An A.C. Impedance Spectroscopy Study of Micro-Cracking in Cement-Based Composites during Compressive Loading 675
C. Ewertson and P.E. Petersson: The Influence of Curing Conditions on the Permeability and Durability of Concrete. Results from a Field Exposure Test 683
S. Sahu, V. Tomková, J. Majling and J. Havlica: Influence of Particle Sizes of Individual Minerals on the Hydration Processes in the System $C_2S-C_4A_3\overline{S}-C\overline{S}$ 693

R.G. Jäger, G. Esser and D. Knöfel: Development of Compressive Strength and Porosity of Some Regulated Set Cements (RSCS) Both Made from Rotary Kiln - and Laboratory Oven Clinker - Hydrated at 20°C and 5°C 700
M. Moukwa, B.G. Lewis, S.P. Shah and C. Ouyang: Effects of Clays on Fracture Properties of Cement-Based Materials 711
C. Andrade: Calculation of Chloride Diffusion Coefficients in Concrete from Ionic Migration Measurements 724

DISCUSSIONS
J. Bensted 743
R. Dron 745
P. Xie and J.J. Beaudoin 747
D. Bonen 749
Z. Hong and D. Darwin 754

NEWS ITEMS 758

1993 **Volume 23, Number 4** **July**

A.V. Saetta, B.A. Schrefler and R.V. Vitaliani: The Carbonation of Concrete and the Mechanism of Moisture, Heat and Carbon Dioxide Flow Through Porous Materials 761
M.Y.A. Mollah, T.R. Hess, Y.-N. Tsai and D.L. Cocke: An FTIR and XPS Investigations of the Effects of Carbonation on the Solidification/Stabilization of Cement Based Systems-Portland Type V with Zinc 773
K.K. Sagoe-Crentsil and F.P. Glasser: "Green Rust," Iron Solubility and the Role of Chloride in the Corrosion of Steel at High pH 785
C. Vipulanandan and S. Krishnan: XRD Analysis and Leachability of Solidified Phenol-Cement Mixtures 792
Ya.P. Ivanov and T.Tz. Roshavelov: Flow Behaviour of Modified Cement Pastes 803
X.-D. Cong, R.J. Kirkpatrick and S. Diamond: ^{29}Si MAS NMR Spectroscopic Investigation of Alkali Silica Reaction Product Gels 811
C. Shi and R.L. Day: Acceleration of Strength Gain of Lime-Pozzolan Cements by Thermal Activation ... 824
H. Akhter, F.K. Cartledge, A. Roy and M.E. Tittlebaum: A Study of the Effects of Nickel Chloride and Calcium Chloride on Hydration of Portland Cement 833
A. Volkwein: The Capillary Suction of Water into Concrete and the Abnormal Viscosity of the Porewater 843
Z. Xu, P. Gu, P. Xie and J.J. Beaudoin: Application of A.C. Impedance Techniques in Studies of Porous Cementitious Materials. II: Relationship between ACIS Behavior and the Porous Microstucture 853
N. Banthia and M. Mani: Toughness Indices of Steel Fiber Reinforced Concrete at Sub-Zero Temperatures 863
S.L. Sarkar and J. Beaulieu: Microstructural Evaluation of a Concrete Overpass System during Rehabilitation 874
T. Matusinovic and D. Curlin: Lithium Salts as Set Accelerators for High Alumina Cement 885
S.V.S. Rao, K.B. Lal and R.V. Amalraj: Epoxy Modified Cements Cured with Catalytic Curing Agents for Fixation of Radioactive Waste 896
N.M.P. Low and J.J. Beaudoin: Flexural Strength and Microstructure of Cement Binders Reinforced with Wollastonite Micro-Fibres 905
E.P. Mora, J. Payá and J. Monzó: Influence of Different Sized Fractions of a Fly Ash on Workability of Mortars 917
D. Penev and M. Kawamura: Estimation of the Spacing and the Width of Cracks Caused by Shrinkage in the Cement-Treated Slab under Restraint 925
M. Ichikawa and Y. Komukai: Effect of Burning Conditions and Minor Components on the Color of Portland Cement Clinker 933
M.-A. Simard, P.-C. Nkinamubanzi, C. Jolicoeur, D. Perraton and P.-C. Aitcin: Calorimetry, Rheology and Compressive Strength of Superplasticized Cement Pastes 939
Z. Xu and R.D. Hooton: Migration of Alkali Ions in Mortar Due to Several Mechanisms 951

A. Goldman and A. Bentur: The Influence of Microfillers on Enhancement of Concrete Strength 962
J.E. Gillott and H. Wang: Improved Control of Alkali-Silica Reaction by Combined Use of Admixtures ... 973
E. Grusczscinski, P.W. Brown and J.V. Bothe, Jr.: The Formation of Ettringite at Elevated Temperature 981

NOTES
J. Bensted: Use of Ferrophosphorus as a Heavyweight Additive for API Oil Well Cements 986
K.C. Quillin, S.L. Duerden and A.J. Majumdar: Formation of Zeolites in OPC-PFA Mixtures 991
J. Bensted: Use of Inductively Coupled Plasma Mass Spectrometry (ICPMS) for Heavy Metal Trace Analysis of API Class G OilWell Cement 993

DISCUSSIONS
H.F.W. Taylor 995
I.G. Richardson and G.W. Groves 999
R. Dron and F. Brivot 1001
S.J. Way and A. Shayan 1003

NEWS ITEMS 1004

1993 **Volume 23, Number 5** **September**

Editorial iii

Z. Xu, P. Gu, P. Xie and J.J. Beaudoin: Application of A.C. Impedance Techniques in Studies of Porous Cementitious Materials. (III): ACIS Behavior of Very Low Porosity Cementitious Systems 1007
N.M.P. Low and J.J. Beaudoin: Mechanical Properties and Microstructure of Cement Binders Reinforced with Synthesized Xonotlite Micro-Fibres 1016
J. Bijen and R. van Selst: Cement Equivalence Factors for Fly Ash 1029
M. Deng, S.F. Han, Y.N. Lu, X.H. Lan, Y.L. Hu and M.S. Tang: Deterioration of Concrete Structures Due to Alkali-Dolomite Reaction in China 1040
R.E. Weyers, S.E. Herald, M.A. Feeney, S.F. How Lum, C. Bader and P.D. Cady: A Field Method for Measuring the Chloride Content of Concrete 1047
A. Rettel, R. Seydel, W. Gessner, J.P. Bayoux and A. Capmas: Investigations on the Influence of Alumina on the Hydration of Monocalcium Aluminate at Different Temperatures 1056
X. Cong and R.J. Kirkpatrick: ^{17}O and ^{29}Si MAS NMR Study of β-C_2S Hydration and the Structure of Calcium-Silicate Hydrates 1065
I. Maki, S. Ito, T. Tanioka, Y. Ohno and K. Fukuda: Clinker Grindability and Textures of Alite and Belite 1078
A. Iob, H. Saricimen, S. Narasimhan and N.M. Abbas: Spectroscopic and Microscopic Studies of a Commercial Concrete Water Proofing Material 1085
J. Tritthart, K. Pettersson and B. Sorensen: Electrochemical Removal of Chloride from Hardened Cement Paste 1095
R.K. Dhir, M.R. Jones and A.E. Elghaly: PFA Concrete: Exposure Temperature Effects on Chloride Diffusion 1105
M. Deng and M.S. Tang: Measures to Inhibit Alkali-Dolomite Reaction 1115
W. Prince and R. Perami: Mise en Evidence du Role Essentiel des Ions OH^- dans les Reactions Alcali-Silice 1121
W. López, J.A. González and C. Andrade: Influence of Temperature on the Service Life of Rebars 1130
I.L.H. Hansson and C.M. Hansson: Electrochemical Extraction of Chlorides from Concrete. Part I - A Qualitative Model of the Process 1141
G.A. Niklasson: Adsorption on Fractal Structures: Applications to Cement Materials 1153
F. Schmidt and F.S. Rostásy: A Method for the Calculation of the Chemical Composition of the Concrete Pore Solution 1159
S. Masse, H. Zanni, J. Lecourtier, J.C. Roussel and A. Rivereau: ^{29}Si Solid State NMR Study of Tricalcium Silicate and Cement Hydration at High Temperature 1169

W.J. McCarter and S. Barclay: A Comparison of Two Methods for Resistivity Measurements on Repair Mortar for Cathodic Protection Systems 1178
P. Barkakati, D. Bordoloi, S. Bandyopadhyay and U.C. Borah: Physico-Chemical Characteristics of Cement Produced Using Sulphur Bearing Fuels in the Black Meal Process for Cement Manufacture 1185
D. Damidot and F.P. Glasser: Thermodynamic Investigation of the $CaO-Al_2O_3-CaSO_4-K_2O-H_2O$ System at 25°C 1195
J. Beretka, B. de Vito, L. Santoro, N. Sherman and G.L. Valenti: Hydraulic Behaviour of Calcium Sulfoaluminate-Based Cements Derived from Industrial Process Wastes 1205
V. Zivica: Alkali-Silicate Admixture for Cement Composites Incorporating Pozzolan or Blast Furnace Slag 1215
L. Konecny and S.J. Naqvi: The Effect of Different Drying Techniques on the Pore Size Distribution of Blended Cement Mortars 1223
A. Shayan: Alkali Reactivity of Deformed Granitic Rocks: A Case Study 1229
R. Talero and J. Palacios: Influence of the Parameter "Specific Surface" in the Qualification as High, or Not, Sulphate Resistance of a Portland Cement 1237
J. Bensted: A Simple Retarder Response Test for Oilwell Cements at High Temperatures 1245

NEWS ITEMS 1250

1993 **Volume 23, Number 6** **November**

Editorial iii

H. Zhou, X. Wu, Z. Xu and M. Tang: Kinetic Study on Hydration of Alkali-Activated Slag 1253
M.J. Bradley and S.E. Wiberley: Studies on the Effect of the Copper and Zinc Content in a Silica By-Product Material When Used in Mortar 1259
Ch. Ftikos, Th. Philippou and J. Marinos: A Study of the Effect of Some Factors Influencing Alinite Clinker Formation 1268
H.T. Cao, L. Bucea and V. Sirivivatnanon: Corrosion Rates of Steel Embedded in Cement Pastes 1273
S.A. Marfil and P.J. Maiza: Zeolite Crystallization in Portland Cement Concrete due to Alkali-Aggregate Reaction 1283
S.K. Roy, L.K. Chye and D.O. Northwood: Chloride Ingress in Concrete as Measured by Field Exposure Tests in the Atmospheric, Tidal and Submerged Zones of a Tropical Marine Environment ... 1289
A. Jadrijevic: Wet Sieve Analysis of Fresh Concrete - Correction Procedures 1307
J.H.D. Hampton and M.D.A. Thomas: Modelling Relationships between Permeability and Cement Paste Pore Microstructures 1317
S. Sahu and J. Majling: Phase Compatibility in the System $CaO-SiO_2-Al_2O_3-Fe_2O_3-SO_3$ Referred to Sulphoaluminate Belite Cement Clinker 1331
A. Bascoul, E.H. Benaija, Y. Berthaud, J.M. Torrenti and Z. Zizi: Analysis of Localization in Concrete Through Stereophotogrametry, Speckle Laser and Replica 1340
J. Majling, S. Sahu, M. Vlna and D.M. Roy: Relationship Between Raw Mixture and Mineralogical Composition of Sulphoaluminate Belite Clinkers in the System $CaO-SiO_2-Al_2O_3-Fe_2O_3-SO_3$ 1351
S.E. Hussain and Rasheeduzzafar: Effect of Temperature on Pore Solution Composition in Plain Cements 1357
L.J. Struble and M.A. Schultz: Using Creep and Recovery to Study Flow Behavior of Fresh Cement Paste 1369
K.K. Sagoe-Crentsil, V.T. Yilmaz and F.P. Glasser: Corrosion Inhibition of Steel in Concrete by Carboxylic Acids 1380
C. Shi and R.L. Day: Chemical Activation of Blended Cements Made with Lime and Natural Pozzolans 1389
M. Deng and M. Tang: Mechanism of Dedolomitization and Expansion of Dolomitic Rocks 1397
T. Sugama and N.R. Carciello: Carbonation of Calcium Phosphate Cements after Long-Term Exposure to Na_2CO_3-Laden Water at 250°C 1409

D. Baweja, H. Roper and **V. Sirivivatnanon:** Relationships Between Anodic Polarisation and Corrosion of Steel in Concrete **1418**
J. Desbrieres: Cement Cake Properties in Static Filtration. On the Role of Fluid Loss Control Additives on the Cake Porosity **1431**
R.K. Dhir, M.R. Jones and **M.J. McCarthy:** Quantifying Chloride-Induced Corrosion from Half-Cell Potential **1443**
Z.M. El-Shakra and **V.S. Gopalaratnam:** Deflection Measurements and Toughness Evaluations for FRC **1455**
N.M.P. Low and **J.J. Beaudoin:** The Effect of Wollastonite Micro-Fibre Aspect Ratio on Reinforcement of Portland Cement-Based Binders **1467**
M.S. Khan and M.E. Ayers: Curing Requirements of Silica Fume and Fly Ash Mortars **1480**

NEWS ITEMS **1491**

INDEX TO VOLUME 23 ..... **1493**
Keyword Index **1499**
Author Index **1501**

KEY WORD INDEX

AASHTO Test, 724
Abrasion, 69
Acceleration, 442
AC Impedance, 359, 531, 581, 675, 853, 1007
AC Impedance Spectroscopy, 157
Additions, 46
Admixtures, 973
Adsorption, 1153
Aggregate Effect, 283
Alinite Clinker, 1268
Alite, 1078
Alkali Activation Slag, 1253
Alkali-Aggregate Reaction, 309, 1229
Alkali-Dolomite Reaction, 1040, 1115
Alkali Metal Salts, 177
Alkali Migration, 951
Alkalis, 1268, 1283
Alkali-Silica Gels, 811
Alkali-Silica Reaction, 93, 471, 973, 1121
Alkali-Silica Reactivity, 55
Alkali Silicate Admixture, 1215
Aluminate Cement, 177
Al_2O_3, 1056
Ammonium Sulfate, 13
Analysis, 1085
Anodic Polarization, 1418
Aspect Ratio, 1467
Backscattered Electron, 576
Belite, 599, 1078
β-C_2S Hydration, 1065
Binding Capacity, 247
Black Meal Process, 1185
Blended Cements, 1223
Bonding, 431
B, 422
Brown Coal, 507
Burning Conditions, 933
By-Product, 1259

Ca^{2+}, 294
Calcium Aluminate, 1, 294
C-A-S-H, 627
$C_4A_3\bar{S}$, 693
$CaO.Al_2O_3$, 1056
$CaO-Al_2O_3-CaSO_4-H_2O$, 221
$CaO-Al_2O_3-CaSO_4-K_2O-H_2O$, 1195
$4CaO.Al_2O_3.Mn_2O_3$, 20
$CaO-SiO_2-Al_2O_3-Fe_2O_3-SO_3$, 1331, 1357
$CaCl_2$, 833
$Ca(OH)_2 + Cl$, 33
$Ca(OH)_2$ Crystals, 484
CS, 693
C_2S, 693
C_3S Hydration, 169
C-S-H Gel, 131
Ca Phosphate Cements, 1409
Ca Sulfoaluminate-Based Cements, 1205
Calculation, 1159
Calorimetry, 939
Capillary Suction, 843
Carbon, 962
Carbonates, 1409
Carbonation, 329, 442, 761, 773
Carbon Fiber, 618
Carboxylic Acids, 1380
Catalytic Curing, 896
Cathodic Protection, 1178
Cement, 157, 283, 1185
Cement Cake, 347, 1431
Cement Composite, 1016, 1215
Cement Equivalence Factor, 1029
Cement Hydration, 833
Cement Paste, 139, 567, 1273
Cement Raw Mix, 651
Cement-Rock, 335
Chemical Activation, 824, 1389
Chemcial Composition, 1159
Chemical Fingerprints, 59
Chemical Identification, 283
Chemistry, 309
Chloride Content, 1047
Chloride Diffusion, 724, 1105
Cl-Ion, 1095
Chlorides, 139, 247, 1141, 1268, 1289, 1418, 1443
Cr, 422
Clays, 711
Color, 933
Composition, 1351, 1357

Composition-Structure-Properties, 187
Compressive Loading, 675
Concrete, 329, 387, 453, 518, 576, 640, 761, 962, 1040, 1047, 1105, 1130, 1141, 1283
Concrete Overpass, 874
Concrete Structures, 69
Control, 973
Copper, 1259
Corrections, 1307
Corrosion, 33, 139, 368, 785, 1380, 1443
Corrosion Rates, 1273
Crack Spacing, 927
Creep Recovery, 1369
Cristobalite, 1121
Crystalline Products, 471
Curing, 583, 1480

Dedolomitization, 1397
Deflection Measurements, 1455
Degradation, 152
Degree of Polymerization, 122
Deterioration, 874, 1040
Diffusion, 1289
Dimensional Variations, 301
Dissolution, 93
Dolostone, 1397
DSP Cement, 480
Drying Techniques, 1223
Durability, 683

Electrical Conductivity, 359
Electrochemical Removal, 1095, 1141
Elevated Temperature, 981
Energy-Dispersive Diffraction, 267
Epoxy, 896
Ettringite, 267, 422, 353, 981
Expansion, 1397
Exposure, 1409

Ferrite Phase, 933
Ferrophosphorus, 988
FRC, 1455
Fibers, 83
Field Exposure, 1289
Field Method, 1047
Field Test, 683
Filtration, 347
Flow, 803
Flow Behavior, 273, 1369
Fluid Loss, 347, 1431
Fly Ashes, 41, 507, 917, 1029, 1105, 1480
FTIR, 773
Fractals, 7, 1153
Fractionation, 917
Fracture Properties, 711
Fracture Surfaces, 7
Fresh Cement Paste, 1369
Fresh Concrete, 1307
Freezing-Thawing, 951
Fuels, 1185

Glass Fiber Reinforcement, 213
Granite, 1229
Green Rust, 785
Grindability, 1078
Gypsum Composites, 213

Half-Cell Potential, 1443
Heat Flow, 761
Heat of Hydration, 196
Heat Treatment, 353
Heavyweight Additive, 988
High Alkalinity, 152
HAC, 885
High pH, 785
Homogeneity, 663
Hydration, 1, 20, 104, 693, 1056, 1169, 1253
Hydration Calorimetry, 46
Hydration Degree, 399
Hydration Kinetics, 194,
Hydraulic Behavior, 1205
Hydraulic Binders, 462
Hydrothermal Conditions, 321
Hydroxyl, 1397

Ice, 69
Images, 576
Ingress, 1289
Inhibition, 1115, 1380
Initial Steps, 33
Interfacial Zone, 567
Intergrinding, 651
Interphase Boundaries, 599
Ion Concentration, 853
Iron Solubility, 785

Kinetics, 93, 1253

Leachability, 792
Lime, 1389
LSF, 1268
Li Salts, 885
Low Porosity, 187
Low Temperature, 863
Low-Velocity Impact Loading, 83

MgO, 1268
Mg Phosphate Cement, 254
$MgSO_4$, 541
MAS-NMR, 321, 811, 833, 1065
Mechanical Properties, 399
Mechanisms, 335, 761
Metakaolin, 627
Methods, 55
Microcracking, 675
Micro-Fibers, 1467
Microfillers, 962
Microscopy, 329, 1283
Microstructure, 399, 518, 541, 581, 663, 874, 905, 1317
Mineralogy, 1351
Minerals, 693
Minor, 59
Minor Elements, 131
Model, 131
Modeling, 1317
Moderate Strength, 507
Modified Cement Pastes, 803
Moisture, 761
Moisture Gradients, 951
Morphology, 484
Mortar, 7, 13, 247, 541, 711, 1259, 1480

New Concrete, 431
$NiCl_2$, 833

Oil Well Cements, 988, 1245
Oil Wells, 347
OPC, 196
Opal, 811
Organics, 1085
Orientation, 599
Oscillatory Shear, 273
Oxygen, 33
^{17}O, 1065

Particle Sizes, 693, 917
Pastes, 247, 273, 399, 1095
Perforation, 83
Permeability 399, 518, 554, 683, 1317
Petrography, 329
pH, 294
Phase Compatibility, 1331
Phase Relations, 627
Phenol-Cement Mixtures, 792
Phosphogypsum, 115
Plain Cements, 1357
Polarization, 1273
Polarography, 603
Polymer, 484
Polymer Admixtures, 301
Polymer Impregnation, 640
Pore Saturation, 368
Pore Size Distribution, 1223
Pore Solution, 104, 1159, 1357
Pore Structure, 1153
Pore Water Viscosity, 843
Porosities, 399, 700, 853
Porous Cementitious Materials, 1007
Porous Cements, 531
Pozzolans, 46, 1389

Properties, 1016
Proton, 169
Proton NMR Relaxation, 1
PFA Concrete, 554

Quantitative Determination, 603

Radioactive Waste, 896
Rapid Repair, 254
Raw Mixture, 1351
Reactivity, 41
Rebars, 1130
Regulated Set Cements, 700
Reinforcement, 554, 618
Reinforcement Bond, 609
Relationships, 1317
Repair, 301
Resistivity, 368, 724
Resistivity Methods, 1178
Restraint, 925
Retardation, 592
Retarder, 1245
Rheology, 939
Rice Husk Ash, 387
Rim, 309
Rock, 567

Sand Concrete, 663
Separate Grinding, 651
Service Life, 1130
Set Accelerators, 177, 885
Shrinkage, 925
^{29}Si, 1065, 1169
Silica, 1259
Silica Fume, 104, 157, 480, 592, 1480
29-Si NMR, 480
SO_4^{2-}, 294
Slag, 518
Slag Cement, 442
Slag Content, 407
Na_2O, 221
Solidification, 773
Solid Solution, 422
Solid State NMR, 169, 1169
Specific Surface, 1237
Speckle Laser, 1340
Static Filtration, 1431
Steel, 33, 1273, 1380
Steel Corrosion, 1418
Steel Fiber Concrete, 863
Steel Reinforcement, 368
Stereophotogrametry, 1340
Stiffness, 387
Strain Localization, 1340
Strength, 115, 387, 700, 824, 905, 939, 962
Stress Corrosion, 13
Structural Model, 377
Sulfate Attack, 1237
Sulfates, 139, 431, 1389
Sulfoaluminate Belite Clinkers, 1351
Sulfur, 1185
Superplasticizers, 152, 592, 939
Supersulphated Cement, 115
Synchrotron Radiation, 267

Techniques, 431
Temperature, 592, 627, 1056, 1105, 1130, 1357
Tensile Loading, 609
Tension, 618
Test, 1245
Textures, 1078
Theory, 41
Thermal Activation, 824
Thermodynamics, 93, 221, 1195
Three-Phase Material, 147
Tobermorite, 321
Toughness, 609, 863, 1455
Trace, 131
Trace Elements, 59
Transition Zone, 147, 335, 581
Tropics, 1289
TEA, 603
Type K Cement, 104

Ultrasound, 640

Very Low Porosity Systems, 377, 462

Wastes, 1205
Waste Sieve Analysis, 1307
Waste Solidification, 196
W/C, 1029
W/C Ratio, 453
Waterproofing Material, 1085
Water Resistance, 213
Water Soluble Polymers, 122
Width, 925
Wollastonite, 905, 1467
Workability, 917

Xonotlite Fibers, 1016
XPS, 773
XRD, 792

Zeolite Crystallization, 1283
Zinc, 773, 1259

AUTHOR INDEX

Abbas, N.M., 1085
Afridi, M.U.K., 484
Aitcin, P.-C., 939
Akhter, H., 833
Al-Amoudi, O.S.B., 139
Alexander, M.G., 567
Al-Hussaini, M.J., 242
Allan, M.L., 609
Alshamsi, A.M., 592
Amalraj, R.V., 896
Andrade, C., 724, 1130
Ash, J.E., 399, 576
Atzeni, C., 301
Auer, St., 422
Ayers, M.E., 1480

Bader, C., 1047
Ballivy, G., 335
Bandyopadhyay, S., 1185
Banthia, N., 863
Barclay, S., 1178
Barkakati, P., 1185
Barnes, P., 267
Bascoul, A., 1340
Baweja, D., 1418
Bayoux, J.P., 1056
Beaudoin, J.J., 157, 187, 359, 377, 488, 531, 581, 675, 747, 853, 905, 1007, 1016, 1467
Beaulieu, J., 874
Benaija, E.H., 1340
Benaissa, A., 663
Bensted, J., 486, 489, 493, 743, 988, 993, 1245
Bentur, A., 962
Beretka, J., 1205
Berthaud, Y., 1340
Bijen, J., 1029
Black, C.J., 507
Blanco Varela, M.T., 20
Bonen, D., 541, 749
Borah, U.C., 1185
Bordoloi, D., 1185
Bothe, J.V., Jr., 981
Bradley, M.J., 1259
Breton, D., 353

Brivot, F., 93, 1001
Brooman, E.W., 640
Brousseau, R., 157
Brouxel, M., 309
Brown, P.W., 981
Bucea, L., 1273
Bushlaibi, A.H., 592
Byars, E.A., 554

Cady, P.D., 1047
Cao, H.T., 1273
Capmas, A., 1056
Carciello, N.R., 1409
Carles-Gibergues, A., 335, 431
Cartledge, F.K., 833
Chatterji, S., 55
Cheng, Y., 83
Chye, L.K., 1289
Cocke, D.L., 773
Cohen, M.D., 104
Cong, X.-D., 811, 1065
Curlin, D., 885
Curtil, L., 329

Damidot, D., 221, 1195
Darwin, D., 754
Day, R.L., 824, 1389
De Ceukelaire, L., 442
Demirbas, A., 491
Demura, K., 484
Deng, M., 1040, 1115, 1397
Deng, Y., 462
Desbrieres, J., 347, 1431
de Silva, P.S., 627
de Vito, B., 1205
Dhir, R.K., 554, 1105, 1443
Diamond, S., 811
Dominguez, R., 20
Dron, R., 93, 745, 1001
Duerden, S.L., 991

Eklind, Å., 245
Elghaly, A.E., 1105
El-Korchi, T., 618
El-Shakra, Z.M., 1455
Erdogan, Y., 491
Erdem, E., 115
Esser, G., 700
Ewertson, C., 683

Feeney, M.A., 1047
Feliu, S., 33
Fentiman, C.H., 267
Frías, M., 46
Fükos, Ch., 1268
Fukuda, K., 599, 1078

Gabrovsek, R., 321
García, N., 46
Genç, H., 491
Garg, M., 213
Gessner, W., 1056
Ghosh, S.N., 41
Gielly, J., 329
Gillott, J.E., 973
Glasser, F.P., 221, 627, 785, 1195, 1380
Goguel, R.L., 59, 283
Goldman, A., 962
González, J.A., 33, 368, 1130
Gopalaratnam, V.S., 1455
Grandet, J., 335, 431
Grimmer, A.R., 169
Groves, G.W., 131, 999
Grusczscinski, E., 981
Gu, P., 157, 359, 531, 581, 675, 853, 1007

Häkkinen, T., 407, 518
Hall, M.G., 399
Hammad, A.M., 7
Hampton, J.H.D., 1317
Han, S.F., 1040
Hansson, C.M., 1141
Hansson, I.L.H., 1141
Hassanali, M., 122
Hausermann, D., 267
Havlica, J., 294, 693
Heidemann, D., 169
Hempel, R., 453
Hempel, S., 453
Herald, S.E., 1047
Hess, T.R., 773
Hills, C.D., 196
Hobbs, D.W., 495
Hong, Z., 754
Hooton, R.D., 951
Hu, Y.L., 1040
Huovinen, S., 69
Hussain, S.E., 1357

Icbudak, H., 152
Ichikawa, M., 933
Ikpong, A.A., 387
Iob, A., 1085
Iqbal, M.Z., 484
Issa, M.A., 7
Ito, S., 1078
Ivanov, Ya.P., 803

Jadrijevic, A., 1307
Jäger, R.G., 700, 41, 239
Jolicoeur, C., 939
Jones, M.R., 1105, 1443

Kakali, G., 651
Katz, R.N., 618
Kawamura, M., 55, 925
Khan, M.S., 1480
Kirkpatrick, R.J., 811, 1065
Knöfel, D., 700
Komukai, Y., 933
Konecny, L., 1223
Kosmac, T., 1
Krishnan, S., 792
Kumar, S., 254
Kumar, S.G., 254
Kurbus, B., 321
Kuzel, H-J., 422

Lahajnar, G., 1
Lal, K.B., 896
Lan, X.H., 1040
Langford, J.I., 399
Leatherman, G.L., 618
Lecourtier, J., 1169
Lewis, B.G., 711
Lobo, C., 104
López, W., 33, 368, 1130
Low, N.M.P., 905, 1016, 1467
Lu, Y.N., 1040
Lum, S.F.H., 1047
Luxán, M.P., 46

Macphee, D.E., 507
Maiza, P.J., 1283
Majling, J., 693, 1331, 1357
Majumdar, A.J., 991
Maki, I., 599, 1078
Mani, M., 863
Marfil, S.A., 1283
Marinos, J., 1268
Maslehuddin, M., 139
Masse, S., 1169
Massidda, L., 301
Matusinovic, T., 177, 885
McCarter, W.J., 1178
McCarthy, M.J., 1443
Mellas, M., 399, 576
Menek, N., 603
Mindess, S., 83
Mollah, Y.A., 773
Monteiro, P.J.M., 147
Monzó, J., 917
Morlier, P., 663
Moukwa, M., 122, 711
Mueller, D., 321
Muhamad, M.N., 267
Murat, M., 329

Nägele, E., 13
Naqvi, S.J., 1223
Narasimhan, S., 1085
Niklasson, G.A., 1153
Nilsen, A.U., 147
Nilsson, L-O., 247
Nkinamubanzi, P.-C., 939
Northwood, D.O., 1289

Odabasoglu, M., 152, 603
Ohama, Y., 484
Ohno, Y., 1078
Ölmez, H., 115, 152
Otero, E., 33
Ouyang, C., 711

Page, C.L., 498
Palacios, J., 1237
Payá, J., 917
Penev, D., 925
Perami, R., 1121
Peris Mora, E., 917
Perraton, D., 939
Perry, R., 196
Petersson, P.E., 683
Pettersson, K., 1095
Philippou, Th., 1268
Pigeon, M., 431
Plunkett, B.A., 242
Poellmann, H., 422
Pollmann, H., 267
Prince, W., 1121
Puertas, F., 20

Quillin, K.C., 991

Ramachandran, V.S., 488
Rao, S.V.S., 896, 169
Rasheeduzzafar, 1357
Rettel, A., 1056
Richardson, I.G., 131, 999
Rivereau, A., 1169
Roper, H., 1418
Roshavelov, T.Tz., 803
Rostásy, F.S., 1159
Roztocká, D., 294
Roussel, J.C., 1169
Roy, A., 833
Roy, D.M., 1351
Roy, S.K., 1289

Sabouni, A.R., 592
Saetta, A.V., 761
Sagoe-Crentsil, K.K., 785, 1380
Sahu, S., 294, 693, 1331, 1351
St. John, D.A., 59, 283
Sánchez de Rojas, M.I., 46
Sangha, C.M., 242
Sanna, U., 301
Santoro, L., 1205
Saricimen, H., 1085
Sarkar, S.L., 874
Saucier, F., 431
Schmidt, F., 1159
Schneider, U., 13
Schrefler, B.A., 761
Schultz, M.A., 273, 1369
Seehra, S.S., 254
Sepe, A., 1
Seydel, R., 1056
Shah, S.P., 711
Sharma, R.C., 41, 239
Shayan, A., 471, 1003, 1229
Sherman, N., 1205
Shi, C., 824, 1389
Sibbick, R.G., 498
Siedel, H., 453
Simard, M.-A., 939
Singh, M., 213
Sirivivatnanon, V., 1273, 1418
Sollars, C.J., 196
Sorensen, B., 1095
Struble, L.J., 273, 1369
Sugama, T., 1409
Sun, G., 480

Taguchi, T., 55
Talero, R., 1237
Tang, L., 247
Tang, M., 187, 377, 462, 1040, 1115, 1253, 1397
Tanioka, T., 1078
Taylor, A.H., 507
Taylor, H.F.W., 995

Thomas, M.D.A., 1317
Tittlebaum, M.E., 833
Tomková, V., 693
Torrenti, J.M., 1340
Toutanji, H.A., 618
Tritthart, J., 1095
Tsai, Y-N., 773
Tsivilis, S., 651

Valenti, G.L., 1205
Van Nieuwenburg, D., 442
Van Selst, 1029
Viguier, C., 663
Vipulanandan, C., 792
Vitaliani, R.V., 761
Vlna, M., 1351
Volkwein, A., 843
Vrbos, N., 177

Walden, P.J., 242
Wang, H., 973
Way, S.J., 471, 1003
Wenda, R., 422
Weyers, R.E., 1047
White, C.A., 241
Wieker, W., 321
Wilberley, S.E., 1259
Wu, H., 640
Wu, X., 462, 1253

Xie, P., 157, 359, 531, 581, 675, 747, 853, 1007
Xu, Z., 187, 359, 377, 462, 531, 675, 853, 951, 1007, 1253

Yilmaz, V.T., 152, 603, 1380
Youn, D., 122
Young, J.F., 480

Zanni, H., 1169
Zanni-Théveneau, H., 169
Zhou, H., 1253
Zivica, V., 1215
Zizi, Z., 1340